



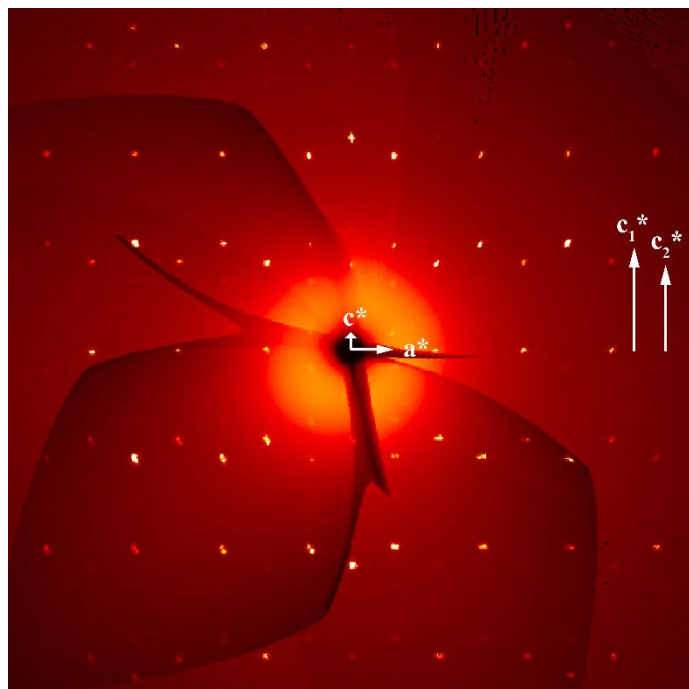
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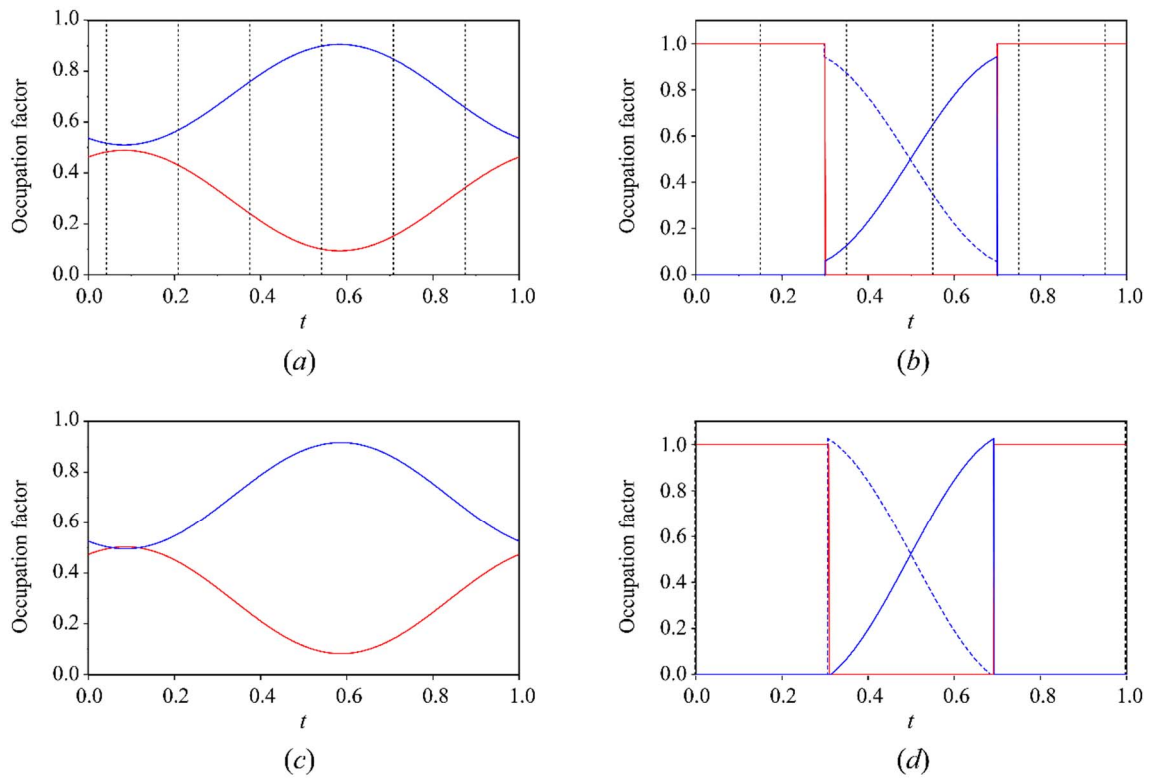
**Supporting information for article:**

**Compositely modulated structures of phosphor materials  
 $\text{Sr}_x\text{Li}_{2+x}\text{Al}_{2-x}\text{O}_4:\text{Eu}^{2+}$**

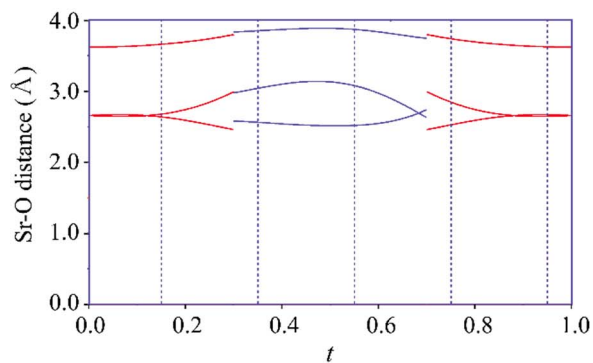
**Atsushi Ooishi, Yuichi Michiue, Shiro Funahashi, Takashi Takeda and Naoto Hirotsuki**



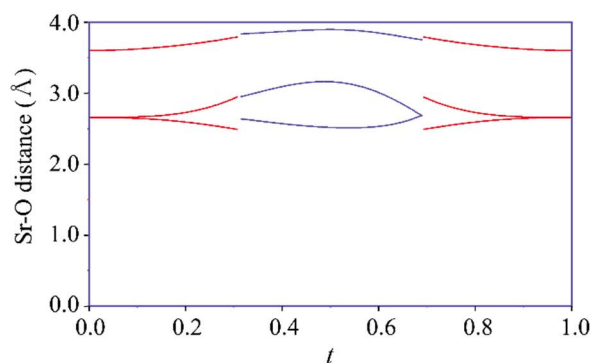
**Figure S1** Diffraction diagram at the section  $k=0$  for  $\text{Sr}_{5/6}\text{Li}_{17/6}\text{Al}_{7/6}\text{O}_4:\text{Eu}^{2+}$ .



**Figure S2** Occupation factors at (a) Li1, Al1, (b) Sr1, Sr2 sites in  $\text{Sr}_{5/6}\text{Li}_{17/6}\text{Al}_{7/6}\text{O}_4:\text{Eu}^{2+}$ , (c) Li1, Al1, and (d) Sr1, Sr2 sites in  $\text{Sr}_{0.827}\text{Li}_{2.827}\text{Al}_{1.173}\text{O}_4:\text{Eu}^{2+}$  as functions of  $t (=x_4 - \mathbf{q} \cdot \mathbf{r})$ . In (a) and (c), a red line is for the Al1 ion, and a blue line for the Li1. In (b) and (d), a red line is for the Sr1 site, and a blue line for the Sr2. Dotted lines in (a) and (b) indicate commensurate  $t$ -sections. A blue broken line in (b) and (d) is for the Sr2 translated by a symmetry operation  $-x_1, -x_2, -x_3, -x_4$ .

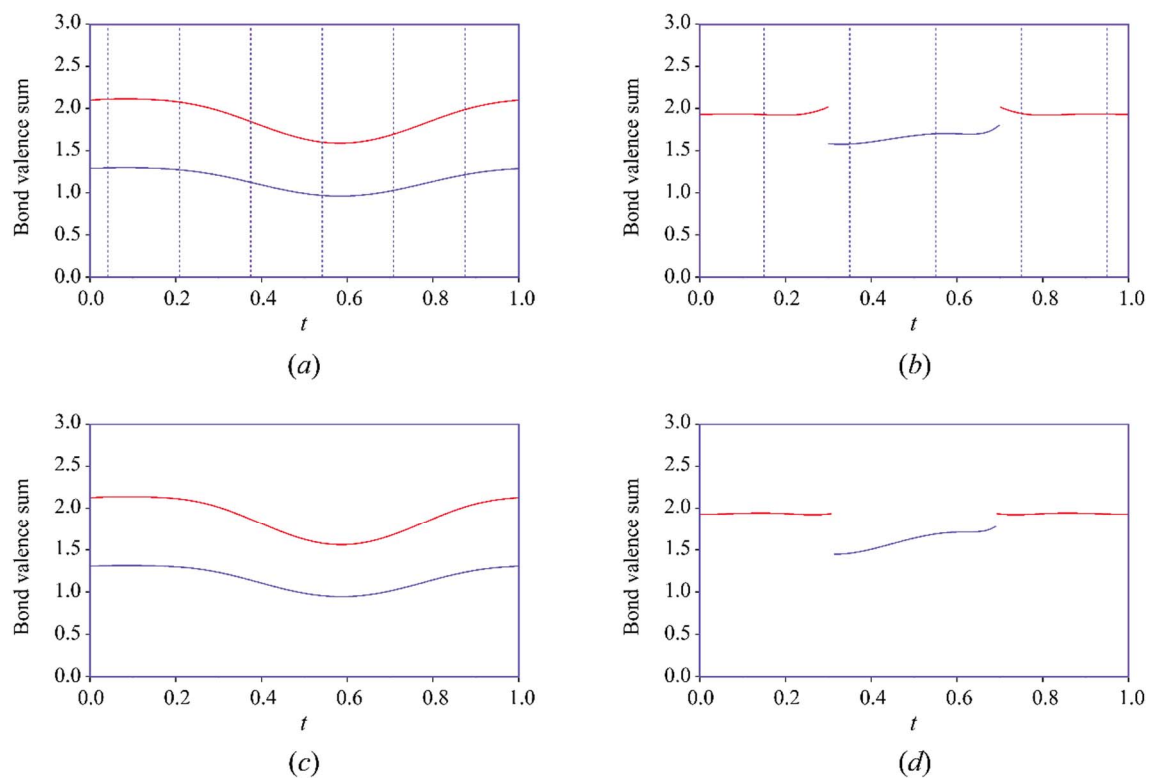


(a)



(b)

**Figure S3** Interatomic distances of Sr-O in (a)  $\text{Sr}_{5/6}\text{Li}_{17/6}\text{Al}_{7/6}\text{O}_4:\text{Eu}^{2+}$  and (b)  $\text{Sr}_{0.827}\text{Li}_{2.827}\text{Al}_{1.173}\text{O}_4:\text{Eu}^{2+}$  as functions of  $t$  ( $=x_4 - \mathbf{q} \cdot \mathbf{r}$ ). Red lines are for the Sr1 site, and blue lines for the Sr2 in each plot. Each line represents quadruplicated Sr-O bonds related by a four-fold rotation axis. Dotted lines in (a) indicate commensurate  $t$ -sections.



**Figure S4** Bond valence sums at (a)  $M$  ( $=\text{Li1/Al1}$ ), and (b) Sr1, Sr2 sites in  $\text{Sr}_{5/6}\text{Li}_{17/6}\text{Al}_{7/6}\text{O}_4:\text{Eu}^{2+}$ , and (c)  $M$  ( $=\text{Li1/Al1}$ ), and (d) Sr1, Sr2 sites in  $\text{Sr}_{0.827}\text{Li}_{2.827}\text{Al}_{1.173}\text{O}_4:\text{Eu}^{2+}$  as functions of  $t$  ( $=x_4-\mathbf{q}\cdot\mathbf{r}$ ). In (a) and (c), a red line is calculated using a parameter set for  $\text{Al}^{3+}-\text{O}^{2-}$ , and a blue line is for  $\text{Li}^{+}-\text{O}^{2-}$ . In (b) and (d), a red line is for the Sr1 site, and a blue line for the Sr2. Dotted lines in (a) and (b) indicate commensurate  $t$ -sections.